

CLAIMS

What is claimed is:

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- 1 1. An apparatus for use in a borehole in an earth formation comprising:
 - 2 (a) a conducting tubular, said tubular having a damping portion for
 - 3 interrupting a flow of eddy currents;
 - 4 (b) a transmitter positioned on a first side of said damping portion for
 - 5 propagating an electromagnetic field in the earth formation;
 - 6 (c) a receiver positioned on a second side opposite said first side of said
 - 7 damping portion axially separated from said transmitter for receiving a
 - 8 temporal signal resulting from interaction of said electromagnetic field
 - 9 with said earth formation; and
 - 10 (d) a processor for determining from said temporal signal a resistivity
 - 11 of said earth formation.
- 12
- 1 2. The apparatus of claim 1, wherein said damping portion further comprises at least
- 2 one cut.
- 3
- 1 3. The apparatus of claim 2, wherein a non-conductive material is disposed within
- 2 said cut.
- 3
- 1 4. The apparatus of claim 1, wherein said damping portion further comprises

- 2 (i) a first segment having a cut, and
3 (ii) a second segment with non-conductive material positioned on an outer
4 face of said segment.
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1 5. The apparatus of claim 1, wherein said damping portion further comprises a
2 segment of pipe with a non-conductive material positioned on an outer face of
3 said segment.
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1 6. The apparatus of claim 1 wherein said non-conductive material comprises a
2 ferrite.
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1 7. The apparatus of claim 1 wherein said non-conductive material comprises a
2 material with low magnetostriction.
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1 8. The apparatus of claim 1, wherein said transmitter further comprises at least one
2 coil oriented so as to induce a magnetic moment in one of (i) a longitudinal
3 parallel to an axis of said tubular, and, (ii) a direction inclined to said longitudinal
4 axis.
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1 9. The apparatus of claim 1, wherein said receiver further comprises at least one coil
2 having an orientation selected from (i) parallel to an axis of said tubular, and, (ii)
3 inclined to an axis of said tubular.
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- 1 10. The apparatus of claim 2 wherein said cut is a longitudinal cut.
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- 1 11. The apparatus of claim 2 wherein said cut is a transverse cut.
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- 1 12. The apparatus of claim 1 further comprising a device for extending said borehole.
2
- 1 13. The apparatus of claim 1 wherein said processor further determines a distance to a
2 bed boundary in said earth formation.
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- 1 14. A method of drilling an earth formation:
2 (a) conveying a bottom hole assembly (BHA) into said earth formation, said
3 BHA including a tubular having a damping portion for interrupting a flow
4 of eddy currents;
5 (b) using a transmitter positioned on a first side of said damping portion for
6 producing an electromagnetic field in the earth formation;
7 (c) using a receiver positioned on a second side opposite said first side of said
8 damping portion axially separated from said transmitter for receiving a
9 temporal signal resulting from interaction of said first signal with said
10 earth formation; and
11 (d) determining from said temporal signal said resistivity of said earth
12 formation.
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1 15. The method of claim 14, wherein said damping portion further comprises at least
2 one cut.

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1 16. The method of claim 15, wherein a non-conductive material is disposed within
2 said cut.

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1 17. The method of claim 14, wherein said damping portion further comprises
2 (i) a first segment having a cut, and
3 (ii) a second segment with non-conductive material positioned on an outer
4 face of said segment.

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1 18. The method of claim 14, wherein said damping portion further comprises a
2 segment of pipe with a non-conductive material positioned on an outer face of
3 said segment.

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1 19. The method of claim 18 further comprising using a ferrite for said non-conductive
2 material.

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1 20. The method of claim 18 further comprising using a material with low
2 magnetostriction for said non-conductive material.

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1 21. The method of claim 14, wherein said transmitter further comprises at least one
2 coil oriented so as to induce a magnetic moment in one of (i) a longitudinal

3 parallel to an axis of said tubular, and, (ii) a direction inclined to said longitudinal
4 axis.

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1 22. The method of claim 14, wherein said receiver further comprises at least one coil
2 having an orientation selected from (i) parallel to an axis of said tubular, and, (ii)
3 inclined to an axis of said tubular.

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1 23. The method of claim 15 wherein said cut is a longitudinal cut.

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1 24. The method of claim 15 wherein said cut is a transverse cut.

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1 25. The method of claim 14 further comprising using a device on said BHA for
2 extending said borehole.

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1 26. The method of claim 14 further comprising determining a distance to an
2 interface in said earth formation.

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1 27. The method of claim 25 wherein (a) – (d) are carried out during continuing
2 rotation of said BHA.

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1 28. The method of claim 26 further comprising using said determined distance for
2 controlling a drilling depth of said BHA.

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1 29. The method of claim 26 wherein said interface comprises a bed boundary.

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1 30. The method of claim 26 wherein said interface comprises a fluid interface.

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